Screening and Management of Bladder and Bowel Dysfunction Among Toilet Trained Children in a General Pediatric Outpatient Clinic of a Tertiary Hospital Using Standard Urotherapy: Prospective Interventional Study

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ABSTRACT

Background: Bladder bowel dysfunction (BBD) is a prevalent yet underdiagnosed condition in toilet-trained children. Early detection and behavioral management through standard urotherapy are key to improving outcomes, but data on its effectiveness in the Filipino pediatric population are limited.

Objective: This study determined the prevalence of BBD among toilet-trained children attending a tertiary hospital's pediatric outpatient clinic, and to evaluate the effectiveness of standard urotherapy among affected children.

Methods: A prospective interventional study was conducted among 144 toilet-trained children aged 7 to 12 years seen at the University of Santo Tomas Hospital outpatient clinic from August 2025 to September 2025. Sociodemographic data were collected, and BBD was screened using the validated Filipino version of the Dysfunctional Voiding Symptom Scores (DVSS) questionnaire. Children with BBD underwent standard urotherapy, which included behavioral and lifestyle interventions such as timed voiding, adequate hydration, constipation management and proper voiding posture. DVSS assessments were repeated at two and four weeks.

Results: The overall prevalence of BBD was 22.9% (33 of 144). BBD was significantly more prevalent among females (31.88%) than males (14.67%) (adjusted OR = 2.96, 95% CI: 1.28–6.86; p = 0.011). At baseline, children with BBD had significantly higher mean total DVSS scores (9.15 ± 3.64) compared to those without (2.01 ± 1.80, p<0.001). After two weeks of standard urotherapy,

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DVSS scores significantly improved with a mean reduction of 6.38 points ($p<0.001$). Improvements were noted across items related to daytime incontinence, wetting, urgency and infrequent voiding. After four weeks, all patients who underwent treatment no longer met the DVSS criteria for BBD, demonstrating clinically significant recovery.

Conclusion: Standard urotherapy proved effective in reducing symptom scores within two weeks and resulted in complete clinical resolution after four weeks among those who continued therapy. Routine screenings for BBD using DVSS and early initiation of standard urotherapy in pediatric outpatient settings are recommended to prevent complications and improve children's urinary and bowel health.

Key Words: Bladder bowel dysfunction, Dysfunctional voiding symptom score, Toilet trained Filipino children

INTRODUCTION

Bladder bowel dysfunction (BBD) is characterized by the co-occurrence of lower urinary tract symptoms (LUTS) such as incontinence, urgency, hesitancy and weak urine flow with bowel symptoms such as constipation and encopresis. About 44.3% of children and adolescents without genitourinary system problems, either in terms of structure or neurological function suffer from BBD.[1,2] In an unpublished study by Pabustan-Romero, et al. in 2024 done in our institution, about 31.94% had BBD and most of the subjects affected were female with a female-to-male ratio of 2.5:1.[3]

The first BBD-specific questionnaire called the Dysfunctional Voiding Symptom Score (DVSS) was published in 2000.[4] The DVSS is a 10-item instrument that was modeled after the international prostate symptom score (IPSS). The total possible score is 30 and a score at or above six for females (Sensitivity [SE] 92%, Specificity [SP] 91%) or nine for males (SE 80%, SP 91%) indicates the presence of BBD.[5]

The first-line non-pharmacological, non-surgical treatment for BBD is standard urotherapy which involves behavioral changes. Constipation management, water consumption guidelines, caffeine reduction, pelvic floor exercise, correcting voiding posture, educational guidance and timed urination are some of the components. By implementing lifestyle modifications and behavioral therapy, the goal is to enhance bladder function and lessen bowel and urine symptoms. For instance, a systematic study found that standard urotherapy decreased nocturnal enuresis by 28.5%, constipation by 43% and urine incontinence by 39.5%, with fecal incontinence decrease by 21% and urinary tract infections decrease by 40.4%.[6]

This study determined the prevalence of BBD and the response to standard urotherapy among children diagnosed with BBD using the DVSS, in a pediatric outpatient clinic of a tertiary and referral hospital in Manila, Philippines. This highlights the significance of screening BBD in the Filipino pediatric population.

The objective of this study was to determine the outcomes of urotherapy in toilet-trained pediatric patients with BBD seen in the outpatient clinic of the University of Santo Tomas Hospital from August 2025 to September 2025.

This study aims to determine the prevalence of BBD among toilet-trained pediatric patients and to identify the age group most commonly presenting with BBD symptoms. It also seeks to determine the proportion of these patients who underwent urotherapy at two and four weeks. In addition, the study intends to compare the DVSS at baseline, and after two and four weeks of urotherapy among the toilet-trained pediatric population.

A significant portion of children who do not have structural alterations in the genitourinary or neurological systems and the discovery of BBD has had clinical significance in the pediatric context. These individuals are susceptible to complications like incontinence-associated diarrhea, incomplete bladder emptying, urinary tract infections (UTIs) and vesicoureteral reflux (VUR), which impair upper urinary tract function. Additionally, BBD has a negative influence on the psychosocial dimension, which may result in depression, anxiety and social isolation. Early identification and comprehensive management of these conditions are crucial for preserving urinary and fecal continence, preventing complications and improving the overall quality of life for affected children.

METHODOLOGY

Research Design

This was a prospective interventional study.

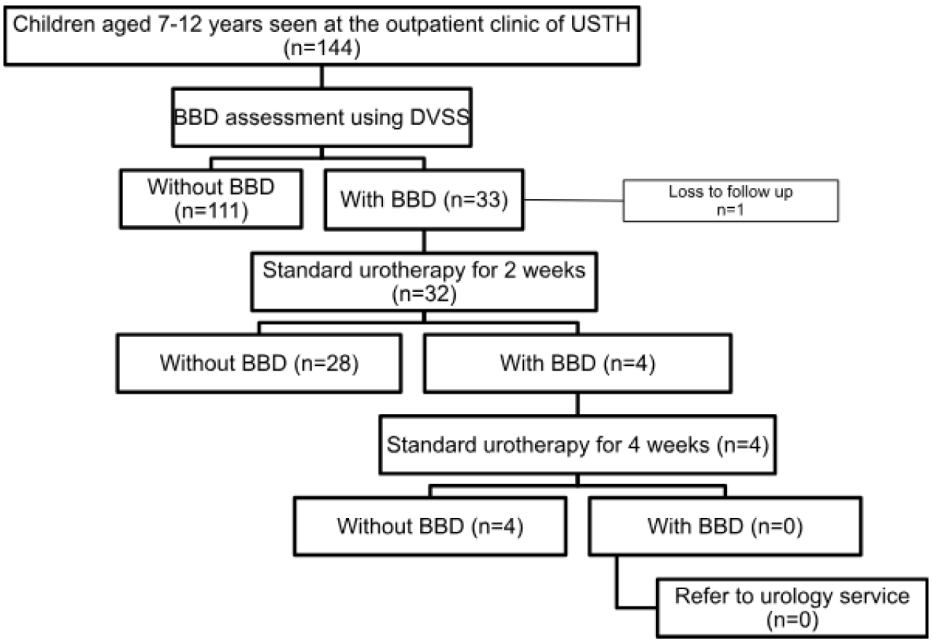

Figure 1: Study framework

Research Subjects

Inclusion Criteria

Children who came to the clinic because of acute illness, follow-up visits or general health control were recruited to participate. The study involved children aged seven to twelve years old who were treated in the general pediatric outpatient clinic at the University of Santo Tomas and whose caregivers consented with the enrollment of participants for the DVSS questionnaire in the Filipino language.

Exclusion Criteria

Children who are not toilet-trained, with urogenital anomalies from birth, and/or taking other necessary medications for other congenital conditions were excluded from the study.

Sampling Procedure and Sample Size Computation

Study participants were selected through consecutive sampling. A minimum sample size requirement of 119 was computed using the OpenEpi free open software. Anticipated frequency was set to 8.6% following a prospective observational BBD study among 7- to 12-year-old Thai children.[7] Statistical power and confidence intervals were set to 80% and 95%, respectively. Sample size was adjusted to account for 20% non-response rate. A total of 144 children were included in the study.

Operational Definition of Study Variables

The outcome variable in this study was the BBD status as defined in the DVSS questionnaire symptom response definitions. Treatment outcome was defined as no-response (<50% reduction) or complete response (>50% to 100% reduction) according to International Children's Continence Society (ICCS) definition. The independent variables were demographic factors including the patient's age, sex, caregiver's educational background, underlying disease and number of siblings. Age and number of siblings were treated as continuous variables wherein age was reported as the current age of the patient in years while number of siblings was the self-reported number of living siblings of the patient. Sex was categorized as male/female. Primary caregivers were mothers/fathers/others and caregiver's educational background was categorized as high school and below/college and above. The frequencies of underlying disease were also reported.

Research Instrument

The DVSS questionnaire is composed of 10 items: seven are about voiding, two are about defecation and one is about stressful events. Among the items,

the scores are calculated from 0-3, thus, there are four levels of frequency over the past month (0 = almost never, 1 = less than half the time, 2 = about half the time, 3 = almost all the time). A DVSS cutoff score of 9 for boys and 6 for girls were used to diagnose BBD. The patients were given an option to choose between an English or Filipino version of the DVSS.

Recruitment Procedure

Permission letters were sent to the Data Privacy Officer (DPO), Ambulatory Care Services (ACS) Head and other unit concerned, and pediatric consultants allowing their patients to participate prior to the conduct of this study. All children aged 7-12 years seen at the general pediatric outpatient clinic of the hospital were asked to complete the DVSS questionnaire with the help of the pediatrician, resident and interns on post. The DVSS was used to screen children with BBD. Children diagnosed with BBD were asked to participate in further study that includes treatment via standard urotherapy at 2 weeks and 4 weeks. Written informed consent to participate in this study was obtained from the children and their parent/caregiver/legal guardian prior by the attending physician to DVSS administration.

Data Collection Procedure

Participants diagnosed with BBD received a standard urotherapy regimen that included frequent voiding throughout the day (4-7 times per day), adequate fluid intake (at least 1-2.5 liters per day), correct voiding posture, avoidance of holding maneuvers, reduction of caffeine consumption, high-fiber diet and regular bowel habits. Timed and double voiding was recommended when necessary and laxatives or enemas were prescribed as needed. The primary investigator contacted parents of the patients to remind them of their scheduled follow-up appointments at two and four weeks. Reminders were sent via text message or telephone call a day prior to the appointment and on the day of the visit. In cases where patients declined to attend their follow-up appointments, they were asked to provide the reasons for discontinuing therapy.

For the first two weeks of treatment, participants maintained a 24-hour bladder diary for three days. The diary was recorded again after 4 weeks for those who were still with BBD after the 2 weeks of treatment. The DVSS questionnaire was completed by the patient and/or their parents, caregivers or legal guardians at both the two-week and four-week follow-ups.

Bladder diaries were provided with information on urinary incontinence, and the treatment outcomes were classified as per International Children's Continence Society guidelines. A scale starting from no improvement to with improvement (50%-100% reduction) was used to grade results. Bladder diary was recorded again in 4 weeks.

For pediatric patients who demonstrated a partial response in DVSS at two weeks and four weeks, a structured and progressive management plan was followed. At the 2-week mark, it was important to assess adherence to the initial treatment plan, including compliance with urotherapy measures such as timed voiding, fluid intake regulation and avoidance of holding behaviors. Reinforcement of urotherapy principles was provided to both the patient and caregivers, and any contributing factors such as constipation or psychosocial stressors were identified and addressed with assistance of the pediatric psychologist in the OPD or the attending physician in their clinics. Patients were recommended to continue urotherapy until four weeks.

Statistical Analysis

All subsequent analyses were carried out in Stata version 17/MP. Descriptive statistics was used for all variables of interest. The distribution of categorical variables was presented using frequency (n) and percentages (%). Meanwhile, mean and standard deviation (SD) or median and range were used to summarize continuous data. The comparison of BBD status when grouped according to different demographic factors was performed using the independent Mann-Whitney U test for continuous variables and chi-squared test for categorical variables. The DVSS scores were compared among baseline and two weeks, and at two weeks and four weeks after standard urotherapy using Wilcoxon signed-rank test. Corresponding p-values were reported. Logistic regression analysis was performed to determine factors associated with BBD status. Crude odds ratio (cOR) and the corresponding 95% confidence intervals (CIs) and p-values were reported.

Consequently, the independent associations between these variables and BBD status were evaluated using multivariable logistic regression wherein adjusted odds ratio (aOR), the corresponding 95% confidence intervals (CIs) and p-values were likewise reported. All tests were two-sided, and a p-value of 0.05 was considered statistically significant.

RESULTS

Among the 144 children included in the study, the prevalence of BBD was 22.9% (33 out of 144). Table 1 presents the sociodemographic characteristics of children with and without BBD. The median age of both groups was similar (8 years among those with BBD and 9 years among those without; p = 0.692), showing no significant age difference. In terms of sex, a significant difference was observed (p = 0.014). Among males, 14.67% had BBD and 85.33% did not, while among females, 31.88% had BBD and 68.12% did not, indicating that BBD was significantly more common in females. The number of siblings did not differ significantly between groups (p = 0.800), with both having a median of two siblings. Regarding the primary caregiver, mothers were the main caregivers for most children, with 21.49% of their children having BBD compared to 78.51% without. For those cared for by fathers, 27.27% had BBD and among those cared for by others, 33.33% had BBD. However, these differences were not statistically significant (p = 0.608). Finally, for caregiver educational background, 20.69% of children with caregivers who had a high school education or below had BBD compared to 24.42% of those whose caregivers had college education or higher. The difference was also not significant (p = 0.602).

Table 2 summarizes the underlying diseases among children with and without BBD. The five most commonly reported conditions among those with BBD were bronchial asthma (15.15%), autism spectrum disorder (ASD and related developmental delays) (9.09%), acute otitis media or otitis externa (6.06%), upper respiratory tract infection (URTI) (6.06%) and high-grade or suspected VUR (6.06%). In comparison, among children without BBD, the most frequent conditions were URTI (9.01%), ASD or ASD with global developmental delay (8.11%), bronchial asthma (6.31%), recurrent tonsillitis (1.80%) and acute otitis media or otitis externa (1.80%). Bronchial asthma and ASD-related conditions were common comorbidities in both groups, though respiratory and otologic conditions appeared slightly more frequent among children with BBD. VUR was observed only in children with BBD.

Children with BBD consistently had higher mean DVSS scores across most items compared to those without BBD. Specifically, those with BBD had higher scores for daytime incontinence (1.03 ± 1.26 versus 0.18 ± 0.47, $p<0.001$) and wetting amount (1.12 ± 1.19 versus 0.14 ± 0.37, $p<0.001$). Similarly, higher scores were noted for low defecation frequency (0.85 ± 0.97 versus 0.41 ± 0.76, $p = 0.005$) and difficult defecation (1.21 ± 1.08 versus

Table 1: Sociodemographic characteristics of children with and without BBD

Characteristics	Total (n=144)	With BBD (n=33)	Without BBD (n=111)	p-value
Age, median (range)	9 ±5	8 ±5	9 ±5	0.692
Sex				0.014***
Male	75	11 (14.67%)	64 (85.33%)	
Female	69	22 (31.88%)	47 (68.12%)	
Number of siblings, median (range)	2 ±7	2 ±6	2 ±7	0.800
Primary caregiver				0.608
Mother	121	26 (21.49%)	95 (78.51%)	
Father	11	3 (27.27%)	8 (72.73%)	
Others	12	4 (33.33%)	8 (66.67%)	
Educational background of caregiver				0.602
High school and below	58	12 (20.69%)	46 (79.31%)	
College and above	86	21 (24.42%)	65 (75.58%)	

*Presented as frequency and row percentages unless otherwise stated. Significant at p<0.05****

Table 2: Underlying diseases of children with and without BBD

Underlying Disease / Condition	With BBD (n=33)	Without BBD (n=111)
Bronchial asthma	*5* (15.15)	*7* (6.31)
URTI	2 (6.06)	10 (9.01)
Phimosis	1 (3.03)	0
ALL	1 (3.03)	0
Mixed hemorrhoids	1 (3.03)	0
Acute otitis media / otitis externa	2 (6.06)	2 (1.80)
Chronic urticaria	1 (3.03)	0
High-grade VUR / t/c VUR	2 (6.06)	0
Otomycosis	2 (6.06)	0
Hydronephrosis	2 (6.06)	0
ASD / ASD + GDD / ASD-level 2	3 (9.09)	9 (8.11)
Recurrent tonsillitis	1 (3.03)	2 (1.80)
JDM	1 (3.03)	0
Metabolic syndrome	1 (3.03)	1 (0.90)
Dental caries	1 (3.03)	0
Chronic ITP, t/c SLE	1 (3.03)	0
PTB / PTB relapse	1 (3.03)	3 (2.70)
Dengue fever	1 (3.03)	2 (1.80)
Major depressive disorder	1 (3.03)	0
Other single occurrences (eg, shingle, cataract, anemia, nummular eczema, etc.)	0 0	25 (22.52)

Presented as frequency and column percentages
URTI: upper respiratory tract infection, ALL: Acute lymphocytic leukemia, VUR: vesicoureteral reflux, ASD: autism spectrum disorder, GDD: Global Developmental Delay, JDM: Juvenile Dermatomyositis, ITP: Immune thrombocytopenia, SLE: Systemic Lupus Erythematosus, PTB:Pulmonary Tuberculosis

Table 3: Mean (SD) DVSS scores of children with and without BBD at baseline

DVSS Item	With BBD (n=33)	Without BBD (n=110)	p-value
Q1 (daytime incontinence)	1.03 ±1.26	0.18 ±0.47	<0.001***
Q2 (wetting amount)	1.12 ±1.19	0.14 ±0.37	<0.001***
Q3 (low defecation frequency)	0.85 ±0.97	0.41 ±0.76	0.005**
Q4 (difficult defecation)	1.21 ±1.08	0.18 ±0.54	<0.001***
Q5 (infrequent voiding)	1.55 ±1.20	0.29 ±0.63	<0.001***
Q6 (curtsying)	1.15 ±1.23	0.37 ±0.75	0.002***
Q7 (urgency)	1.03 ±1.24	0.22 ±0.63	<0.001***
Q8 (push to void)	0.36 ±0.86	0.03 ±0.16	0.002***
Q9 (dysuria)	0.12 ±0.55	0.01 ±0.09	0.183
Q10 (stressful events)	0.73 ±1.31	0.19 ±0.73	0.013***
Total DVSS	9.15 ±3.64	2.01 ±1.80	<0.001***

** significantly lower; *** significantly higher;

0.18 ± 0.54, $p<0.001$). Children with BBD also had higher mean scores for infrequent voiding (1.55 ± 1.20 versus 0.29 ± 0.63, $p<0.001$), curtsying (1.15 ± 1.23 versus 0.37 ± 0.75, $p = 0.002$) and urgency (1.03 ± 1.24 versus 0.22 ± 0.63, $p<0.001$). For push to void, scores were likewise higher among those with BBD (0.36 ± 0.86 versus 0.03 ± 0.16, $p = 0.002$). While dysuria scores were slightly higher among children with BBD (0.12 ± 0.55 versus 0.01 ± 0.09), this difference was not statistically

Table 4: Comparison of mean (SD) DVSS scores at baseline and 2 weeks standard urotherapy in children with BBD at baseline (n=32)

DVSS Item	Baseline	2 weeks	Mean Difference (SE)	p-value
Q1 (daytime incontinence)	1.03 ±1.26	0.34 ± 0.60	0.72 ± 0.22	0.006***
Q2 (wetting amount)	1.12 ± 1.19	0.34 ± 0.60	0.81 ± 0.21	0.001***
Q3 (low defecation frequency)	0.85 ± 0.97	1.03 ± 0.78	-0.16 ± 0.22	0.549
Q4 (difficult defecation)	1.21 ± 1.08	0.97 ± 0.78	0.25 ± 0.22	0.238
Q5 (infrequent voiding)	1.55 ± 1.20	0.03 ± 0.18	1.50 ± 0.22	<0.001***
Q6 (curtsying)	1.15 ± 1.23	0.06 ± 0.25	1.09 ± 0.22	<0.001***
Q7 (urgency)	1.03 ± 1.24	0.03 ± 0.18	1.00 ± 0.22	<0.001***
Q8 (push to void)	0.36 ± 0.86	0.03 ± 0.18	0.28 ± 0.15	0.125
Q9 (dysuria)	0.12 ± 0.55	0	0.13 ± 0.10	0.500
Q10 (stressful events)	0.73 ± 1.31	0	0.75 ± 0.23	0.008***
Total DVSS	9.15 ± 3.64	2.84 ± 2.45	6.38 ± 0.47	<0.001***

***significantly decreased;

Table 5: Comparison of mean (SD) DVSS scores at 2 weeks and 4 weeks standard urotherapy in children with BBD at week 2 (n=4)

DVSS Item	2 weeks	4 weeks	Mean Difference (SE)	p-value
Q1 (daytime incontinence)	1.00 ± 0.82	0.50 ± 0.58	0.50 ± 0.50	1.000
Q2 (wetting amount)	1.00 ± 0.82	0.50 ± 0.58	0.50 ± 0.50	1.000
Q3 (low defecation frequency)	2.25 ± 0.96	1.00 ± 0.82	1.25 ± 0.25	0.125
Q4 (difficult defecation)	2.00 ± 1.15	1.00 ± 0.82	1.00 ± 0.41	0.250
Q5 (infrequent voiding)	0	0	0	1.000
Q6 (curtsying)	0.50 ± 0.58	0.75 ± 1.50	0.25 ± 0.63	1.000
Q7 (urgency)	0.25 ± 0.50	0.25 ± 0.50	0 ± 0.41	1.000
Q8 (push to void)	0.25 ± 0.50	0	0.25 ± 0.25	1.000
Q9 (dysuria)	0	0	0	1.000
Q10 (stressful events)	0	0	0	1.000
Total DVSS	7.25 ± 1.50	4.8 ± 0.82	3.25 ± 0.95	0.125

significant (p = 0.183). In contrast, stressful events were significantly higher in the BBD group (0.73 ± 1.31 versus 0.19 ± 0.73, p = 0.013).

As expected, the total DVSS score was significantly higher among children with BBD (9.15 ± 3.64) than those without (2.01 ± 1.80, p<0.001).

After two weeks of standard urotherapy, significant improvements were observed in several DVSS items among children with BBD. The total DVSS score showed a substantial reduction, with a mean difference of 6.38 (p<0.001), indicating significant symptom improvement after two weeks of standard urotherapy. The mean difference for daytime incontinence was 0.72 (p = 0.006), and for wetting amount 0.81 (p = 0.001). Infrequent voiding showed the largest improvement with a mean difference of 1.50 (p<0.001), followed by curtsying with a mean difference of 1.09 (p<0.001) and urgency with 1.00 (p<0.001). A significant improvement was also seen for stressful events, with a mean difference of 0.75 (p = 0.008). In contrast, changes in low defecation frequency (mean difference = -0.16, p = 0.549),

Table 6: Treatment response (%) of patients with BBD who underwent standard urotherapy

Duration	Treatment Response, n (%)	
	Complete (50% and above)	Partial (Below 50%)
Week 2 (n=32)	26 (81.25)	6 (18.75)
Week 4 (n=4)	1 (25.00)	3 (75.00)

Table 7: Factors associated with BBD (n=144)

Characteristics	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age	0.96 (0.79, 1.16)	0.662	0.92 (0.75, 1.13)	0.444
Female sex	2.72 (1.20, 6.16)	0.016***	2.96 (1.28, 6.86)	0.011***
Number of siblings	1.07 (0.82, 1.40)	0.620	1.07 (0.79, 1.45)	0.649
Caregiver - father	0.73 (0.19, 2.95)	0.658	0.86 (0.19, 3.78)	0.838
Caregiver - others	1.33 (0.22, 7.98)	0.753	1.62 (0.25, 0.58)	0.615
College and above education	1.24 (0.55, 2.77)	0.602	1.36 (0.58, 3.19)	0.487

Outcome: With BBD at baseline. OR – odds ratio. CI – confidence interval.
*** - statistically significant;

difficult defecation (0.25, $p = 0.238$), push to void (0.28, $p = 0.125$) and dysuria (0.13, $p = 0.500$) were not statistically significant.

Between the second and fourth week of standard urotherapy, no statistically significant changes were observed across all DVSS items among children with BBD. The mean differences for daytime incontinence and wetting amount were both 0.50 ($p = 1.000$), while low defecation frequency had a mean difference of 1.25 ($p = 0.125$) and difficult defecation showed 1.00 ($p = 0.250$). Changes in curtsying (-0.25, $p = 1.000$), urgency (0, $p = 1.000$), push to void (0.25, $p = 1.000$) and dysuria (0, $p = 1.000$) were minimal and nonsignificant. Likewise, no differences were observed for stressful events (0, $p = 1.000$). Although the total DVSS score decreased by a mean difference of 3.25 ($p = 0.125$), this reduction remains clinically significant, as all four children who continued urotherapy through week 4 improved and no longer met the criteria for BBD after repeat DVSS screening.

Table 6 shows the treatment response of patients with BBD who underwent standard urotherapy. After two weeks of treatment, 81.25% of patients achieved a complete response (≥50% improvement), while 18.75% had a partial response (<50% improvement). By four weeks, one of the four patients (25%) demonstrated a complete response and three (75%) showed a partial response.

Table 7 presents the factors associated with BBD among pediatric patients. Among all variables analyzed, female sex was the only factor found to be significantly associated with BBD. In the univariate analysis, females had 2.72 times higher odds of having BBD compared to males (cOR = 2.72; 95% CI: 1.20–6.16; p = 0.016). This association remained statistically significant even after adjusting for other sociodemographic factors, with females being 2.96 times more likely to have BBD (aOR = 2.96; 95% CI: 1.28–6.86; p = 0.011). No other variables demonstrated significant associations with BBD in both crude and adjusted models.

DISCUSSION

BBD is a clinically significant condition commonly observed in the pediatric population. Among school-aged children, reported prevalence rates range from 9% to 22%.[8-10] In our cohort, the prevalence of BBD was 23%, notably lower than other previous studies.[3,11,12] The prevalence of BBD varies considerably across regions. In urological clinics, BBD could affect up to 44% of healthy children and adolescents.[8] BBD prevalence is often

underreported in Asian countries, although a study conducted among Thai children aged 4 to 12 years found a lower prevalence of only 8%.[7]

The prevalence of BBD was twice as high in females compared to males (female-to-male ratio = 2:1), consistent with previous findings.[3,7,13] This gender difference has been attributed to a combination of anatomical, hormonal and behavioral factors.[13] BBD has the potential to place considerable physical and mental burden on affected children. It is frequently associated with VUR and recurrent urinary tract infections (UTIs), which can eventually lead to renal scarring and kidney failure.[1,2,5,6] Girls are at increased risk for both functional LUTS and constipation, underscoring the need for targeted, gender-specific preventive approaches.[13] BBD also negatively impacts the children's quality of life and self-esteem. Early diagnosis and treatment of BBD are critical to avoid secondary comorbidities that can impair children's kidney and bladder function, as well as their psychosocial well-being.[14]

At baseline, the most common symptoms suggestive of BBD were infrequent voiding, difficult defecation and curtsying. The link between urinary and fecal dysfunction is now understood to result from their common embryologic development and shared denervation of the genitourinary and gastrointestinal neural pathways.[12] Constipation may interfere with normal urination, as repeated straining during bowel movements can weaken the pelvic floor muscles that support the bladder.[15] For instance, a population-based study among 829 children reported a 9% prevalence of BBD and found that constipated children were 6.8 times more likely you have LUTD.[9]

The management of BBD in toilet-trained children using standard urotherapy is an area that focuses on the efficacy of various therapeutic interventions. Standard urotherapy is widely regarded as the first-line treatment for BBD in children, consisting of behavioral modifications and education on normal bladder function. Standard urotherapy has demonstrated its effectiveness in symptom reduction and improvement of bladder function.[16] A systematic review found that urotherapy effectively reduces symptoms and improves uroflowmetry parameters in children and adolescents with BBD, affirming its recommendation as a primary treatment.[6] In addition, another systemic review revealed that the prevalence of BBD among toilet-trained children with primary VUR was reported to be 49%,[16] which highlights the need for effective screening and management strategies in this population. For children with autism spectrum disorder (ASD), BBD is often more prevalent, correlating with the severity of ASD symptoms. Standard urotherapy has been shown to alleviate symptoms such as constipation and voiding dysfunction in this subgroup.[17,18]

Standard urotherapy can take several weeks to a few months to show noticeable improvements in bladder control and symptoms. Among our patients screened for BBD at baseline, 97% (32/33) continued standard therapy, with one patient dropping out. After two weeks of treatment, 26 patients (81.3%) achieved a complete response (≥50% improvement), while six (18.7%) showed a partial response (<50% improvement). However, of the six patients with only partial response, four no longer met the criteria for BBD by the end of week 2 and did not require further urotherapy. Meanwhile, among those with complete response, two patients still had persistent BBD at week 2 and required an additional two weeks of urotherapy.

The International Children's Continence Society (ICCS) recommends that patients with persistent symptoms and no improvement after initial conservative management (often around 1-3 months) should be referred to a urologist.[19] Meanwhile, the European Association of Urology (EAU) suggests that the initial trial of urotherapy typically lasts around 4-6 weeks before considering further intervention.[20] Four of our patients continued urotherapy through week 4, with three showing a partial response and one achieving a complete response. However, all four no longer had BBD by the end of the 4-week treatment period.

This study has several limitations. Being conducted at a single center limits the generalizability of findings to other populations and settings. The use of consecutive sampling and inclusion of patients presenting for acute illness, follow up, or general health visits introduces selection bias. Data collection relied on self- or caregiver-reported DVSS questionnaires and bladder diaries, which are subject to recall bias and variable interpretation. Additionally, the short follow-up period of 2 and 4 weeks may not capture long-term treatment outcomes or relapse. Adherence to urotherapy could vary despite reminders, potentially affecting results. Finally, the absence of

a control group and limited assessment of potential confounders, such as psychosocial factors, diet, or physical activity restricts the ability to draw causal inferences regarding treatment effectiveness.

CONCLUSION AND RECOMMENDATION

BBD is a prevalent and clinically significant condition in children, particularly among females, and is frequently associated with constipation and LUTS. Early identification and management are essential to prevent potential urological complications and psychosocial impacts. Standard urotherapy proved effective in our cohort of patients with BBD, with most patients achieving complete or substantial improvement within 4 weeks. Based on these findings, routine screening for BBD in pediatric outpatient settings is recommended, alongside prompt initiation of standard urotherapy for affected children. Clinicians should provide ongoing monitoring, reinforce adherence to behavioral interventions and consider referral to pediatric urologists for persistent or complex cases. Future studies should include larger, multicenter cohorts with longer follow-up periods and control groups to further validate the efficacy and sustainability of urotherapy in diverse populations.

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